WHAT IS CLAIMED IS:

1. A process for chemically milling a metal part without causing significant intergranular attack comprising the steps of:

providing a milling solution containing nitric acid, hydrofluoric acid, dissolved titanium, a wetting agent, and water;

maintaining said milling solution at a temperature in the range of from about 110 to 130°F; and

immersing said metal part into said milling solution for a time sufficient to mill a desired depth on at least one surface of said part.

2. A process according to claim 1, wherein said wetting agent comprises a surfactant and said milling solution providing step comprises adding said surfactant to said milling solution in an amount that said milling solution has a surface tension of from about 30 dynes/$cm^2$ to about 36 dynes/$cm^2$.

3. A process according to claim 1, wherein said milling solution providing step comprising adding said nitric acid and said hydrofluoric acid so that the ratio of said nitric acid to said hydrofluoric acid is in the range of from about 1:1 to about 2:1.

4. A process according to claim 3, wherein the ratio of said nitric acid to hydrofluoric acid is in the range of from about 1:1 to about 1.5:1.

5. A process according to claim 1, wherein said milling solution providing step comprises maintaining said dissolved titanium in an amount up to about 2.5 oz./gal.

6. A process according to claim 5, wherein said milling solution providing step comprises maintaining said dissolved titanium in an amount up to about 0.5 oz./gal.

7. A process according to claim 5, wherein said milling solution providing step comprises maintaining said dissolved titanium in an amount up to about 1.5 oz./gal.

8. A process according to claim 5, wherein said milling solution providing step comprises adding said dissolved titanium in an amount from about 1.5 oz./gal. to about 2.5 oz./gal.

9. A process according to claim 1, wherein said wetting agent comprises a fluorosurfactant.

10. A process according to claim 1, wherein said part is formed from a titanium alloy.

11. A process according to claim 1, further comprising adding to said solution at least one material which increases the milling rate of said solution.

12. A process according to claim 11, wherein said at least one material adding step comprises adding urea in an amount greater than about 20 grams per liter.

13. A process according to claim 11, wherein said at least one material adding step comprises adding dissolved palladium in an amount greater than about 10 ppm.

14. A process according to claim 13, wherein said at least one material adding step comprises adding said dissolved palladium in an amount in the range of from about 50 ppm to about 200 ppm.

15. A process according to claim 1, wherein said maintaining step comprises maintaining said solution at a temperature in the range of from about 115°F to about 125°F.

16. A chemical milling solution comprising nitric acid, hydrofluoric acid, a wetting agent, a quantity of dissolved titanium, and the balance water.

17. A chemical milling solution according to claim 16, wherein said nitric acid and hydrofluoric acid are present in a ratio of nitric acid to hydrofluoric acid in the range of from about 1:1 to about 2:1.

18. A chemical milling solution according to claim 16, wherein said nitric acid to hydrofluoric acid ratio is in the range of from about 1:1 to about 1.5:1.

19. A chemical milling solution according to claim 16, wherein said nitric acid is present in an amount from about 7.2 vol% to about 10.5 vol%.

20. A chemical milling solution according to claim 16, wherein said hydrofluoric acid is present in an amount from about 3.5 vol% to about 7.0 vol%.

21. A chemical milling solution according to claim 16, wherein said wetting agent is present in an amount sufficient to provide

said milling solution with a surface tension ranging from about 30 dynes/$cm^2$ to about 36 dynes/$cm^2$.

22. A chemical milling solution according to claim 16, wherein said dissolved titanium is present in an amount up to about 2.5 oz./gal.

23. A chemical milling solution according to claim 16, wherein said dissolved titanium is present in an amount up to about 0.5 oz./gal.

24. A chemical milling solution according to claim 16, wherein said dissolved titanium is present in an amount up to about 1.5 oz./gal.

25. A chemical milling solution according to claim 16, further containing at least one material for increasing the milling rate of the solution.

26. A chemical milling solution according to claim 25, wherein said at least one material comprises urea in an amount greater than about 20 grams per liter.

27. A chemical milling solution according to claim 25, wherein said at least one material comprises dissolved palladium in an amount greater than about 10 ppm.

28. A chemical milling solution according to claim 25, wherein said at least one material comprises dissolved palladium in an amount in the range of from about 50 ppm to about 200 ppm.